

# *Spectroscopy & Chromatography*

***Jasco***

# Fourier Transform Infrared Spectrometers

## FTIR Spectrometers

### ■FT/IR-4X/6X/8X■

The FT/IR-4X is research-grade in performance, functionality and expandability, and supports high resolution, high S/N, high sensitivity detectors, extending measurement wavenumber, microscopy with linear array detector, and rapid scan. The sample compartment is 200 mm wide, the same width as that of a high-end model, and can accommodate conventional accessories, including those from third parties. FT/IR-6X/8X offers reliable operation with industry-leading sensitivity and the most advanced technology available today.

**FT/IR-4X** : Spectral range 7800 – 350  $\text{cm}^{-1}$ , Max. resolution 0.4  $\text{cm}^{-1}$

**FT/IR-6X** : Spectral range 7800 – 350  $\text{cm}^{-1}$  (Option: 25000 – 20  $\text{cm}^{-1}$ ), Max. resolution 0.25  $\text{cm}^{-1}$

**FT/IR-8X** : Spectral range 7800 – 350  $\text{cm}^{-1}$  (Option: 25000 – 20  $\text{cm}^{-1}$ ), Max. resolution 0.07  $\text{cm}^{-1}$



FT/IR-4X



FT/IR-6X



FT/IR-8X

## Accessories



Single reflection ATR  
■ATR PRO 4X■



Single reflection ATR  
■ATR PRO ONE X■



Multiple reflection ATR  
■ATR PRO PENTA X■



Grazing angle reflection  
■RAS PRO 85X■



Diffuse reflection  
■DR PRO 410MX■



12 m gas cell with stainless cell body  
■LPC-12M-S■

## Automatic Broadband Measurement System

### ■FT/IR-6X/8X■

Automatic and continuous measurements over a wide wavenumber range can be performed while maintaining vacuum conditions. Automatic exchange of beam splitters and switching of light sources and detectors are controlled by software.



FT/IR-6X

## Versatile FTIR Spectrometers

### ■VIR-100/200/300■

The VIR Series rugged FTIR spectrometer is compact, lightweight and making it easily transportable. The collimated entrance and exit ports make it an ideal instrument for a wide range of user-designed experiments. The standard instrument includes a hermetically sealed interferometer, DLATGS detector, high intensity ceramic light source, KRS-5 windows and automatic alignment. Options are available for increased sensitivity, optional spectral ranges including NIR, and battery operation.

**VIR-100** : Spectral range 7800 – 350  $\text{cm}^{-1}$ , Max. resolution 0.9  $\text{cm}^{-1}$

**VIR-200** : Spectral range 7800 – 350  $\text{cm}^{-1}$ , Max. resolution 0.4  $\text{cm}^{-1}$

**VIR-300** : Spectral range 15000 – 2200  $\text{cm}^{-1}$ , Max. resolution 0.4  $\text{cm}^{-1}$



VIR-200



Gas Analysis

## Combined system - IR and Raman

### ■FT/IR-4X + PR-1w■

Raman spectroscopy is a popular technique for the analysis of the molecular structure and is considered complementary to IR spectroscopy.

Combining PR-1w Palmtop Raman spectrometer with FTIR spectrometer enables to get more information than the one obtained from an instrument. This mount switches between FTIR and Raman measurements, allowing combined analysis without moving the sample.



FT/IR-4X + PR-1w



# FTIR Microscopes

## Linear Array FTIR Imaging Microscope

### ■IRT-7200■

The IRT-7200 Linear Array FTIR Imaging microscope includes two detectors as standard, a 16-channel linear array detector and a single-element mid-band MCT detector. The combination of the standard automatic sample stage and IQ Mapping allows mapping analyses of a larger sample area, multi-area ATR mapping, and IR imaging of a specified area with extremely high spatial resolution and excellent sensitivity in a short time.



## Fully Automated FTIR Microscope

### ■IRT-7100■

The IRT-7100 automated FTIR microscope includes a standard mid-band MCT detector, with an option to simultaneously install up to two detectors. It is easily field-upgradable to an IR imaging system by adding an optional linear array detector. The standard automatic sample stage provides wide area mapping and multi-ATR mapping together with IQ Mapping.



## FTIR Microscope

### ■IRT-5200■

The IRT-5200 FTIR microscope includes a mid-band MCT detector (up to two detectors can be installed). IQ Mapping allows transmission/reflectance and ATR mapping experiments without moving the sample stage. An optional automatic XYZ stage provides auto-focus and mapping or imaging analysis of larger sample areas.



FT/IR-6X + IRT-7200



FT/IR-4X + IRT-5200

# Confocal Raman Imaging Microscopes Laser Raman Spectrometer

## Confocal Raman Imaging Microscopes

### ■NRS-5500/7500■

Highly accurate data can be stably acquired by automating system control and optical adjustment.

It is equipped with automatic correction for wavenumber and Raman intensity, measurement advisory functions, and expandability to low wavenumber range measurements, Quick Raman Imaging (QRI).



NRS-5500

## Confocal Raman Microscope

### ■NRS-4500■

The NRS-4500 is a purpose designed Confocal Raman Microscope with a wide functionality to make setup fast and easy. When changing lasers the selection and alignment of the laser, rejection filter and grating are fully automated.



NRS-4500

## Probe Raman Spectrometers

### ■RMP-510/520/530■

The RMP-500 Series is a 'field-rugged' probe Raman spectrometer with a robust optical design and tolerance to being transported. The spectral performance ( $2\text{ cm}^{-1}$ ) is comparable to that of a conventional high resolution bench-top Raman system and offers many of the same features, such as interchangeable gratings for selecting wavenumber range and spectral resolution.



RMP-510

## Palmtop Raman Spectrometer

### ■PR-1w■

The PR-1w is a user-friendly Raman spectrometer that can be used by virtually anyone with minimal training. It can be used in many different environments, and variety of measurement concepts, such as in-line and in-situ measurements. With a comprehensive range of optional accessories, the PR-1w can be optimized for specific applications.



PR-1w

# UV-Visible/NIR Spectrophotometers

## UV-Visible/NIR Spectrophotometers

### ■V-730/750/760/770/780■

The V-700 Series comprises five distinct models covering the entire spectrum from the far-UV (187 nm) to the near-IR (3200 nm). The compact optical design of the V-700 Series UV-Visible spectrophotometers significantly reduces the requirement for bench space in the modern laboratory.

A variety of cell holders and dedicated programs can be combined to evaluate advanced materials

**V-730** : A general-purpose double-beam spectrophotometer with a compact space saving design

**V-750** : A high-resolution UV-Visible double-beam spectrophotometer with single monochromator, variable SBW and PMT detector

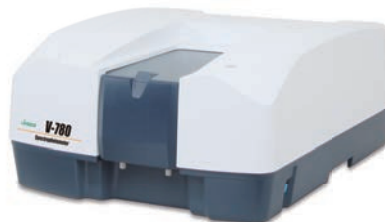
**V-760** : A high-resolution UV-Visible double-beam spectrophotometer with double monochromator for Photometric Linearity to greater than 6 Abs.

**V-770** : A wide-range UV-Visible/NIR Spectrophotometer with PbS detector for wavelengths up to 3200 nm

**V-780** : A single monochromator, dual gratings and InGaAs detector for enhanced sensitivity in the NIR region up to 1600 nm.



**V-730**



**V-780**

## Accessories



Long path cell holder  
■LSE-701■



Water-cooled peltier thermostatted  
6/8-position automatic cell changer  
■PAC-743R■



One drop accessory  
■SAH-769■



Automated absolute reflection  
measurement accessory  
■ARMV-919■



60 mm dia. integrating sphere  
■ISV-922■

## Portable UV-Visible/NIR Spectrophotometers

### ■MV-3100/3200/3300■

The MV-3000 Series of modular UV-visible/NIR spectrophotometers can measure spectra in as little as 5 msec. by using a multi-channel detector. The absence of a driving mechanism for the diffraction grating provides high durability, space saving and portability, and the fiber probe is suitable for on-site measurement and production line monitoring.



**MV-3200**

# Spectrofluorometers



## Spectrofluorometers

### ■FP-8250/8350/8550/8650■

The FP-8050 Series of spectrofluorometers includes four different models that provide solutions for the broadest range of applications including QC, biomolecular structural studies, environmental monitoring and advanced materials science.

**FP-8250** : Simple and sensitive system which readily accommodates routine measurements and accessories, such as spectral scanning, quantitation, and temperature control.

**FP-8350** : A powerful combination of performance, sensitivity and flexibility for biological, environmental and materials analysis.

**FP-8550** : Sophisticated optical system offering the ultimate in sensitivity, spectral accuracy, and flexibility for the most challenging materials and biological samples.

**FP-8650** : Uniquely optimized for NIR applications with extended wavelength measurement to 1010 nm.



FP-8350



FP-8550

## UV-Visible/NIR Microscopic Spectrophotometers



## UV-Visible/NIR Microscopic Spectrophotometers

### ■MSV-5500/5700/5800■

The MSV-5000 Series UV-Visible/NIR Microscopic Spectrophotometers can be used for a broad range of applications including the measurement of transmittance/reflectance spectra, band gap, film thickness, evaluation of the optical characteristics of functional crystals and color analysis of microscopic samples. The MSV-5000 series includes 3 different configurations for UV-Visible/NIR microscopy.



MSV-5700



# Circular Dichroism Spectrometers

## Circular Dichroism (CD) Spectrometers

### ■J-1100/1500/1700■

J-1000 series consist of 3 different models as J-1100, J-1500 and J-1700. Each model has reliable performance with the optimized optics and the latest technology of digital signal processing. As the UV/VIS model with measurement range from 180 nm to 600 nm, J-1100 is suitable for the research of biomaterials, such as protein or nucleic acid. The high end model of J-1500 with the measurement range from 163 nm to 1600 nm, will answer all the demands for not only the protein, nucleic acid, but also the chiral molecule, super molecule and metal complex. And J-1700 is high-end model, which has ability to obtain data up to 2500 nm wavelength.



J-1500

## Circularly Polarized Luminescence (CPL) Spectrometer

### ■CPL-300■

The CPL spectrometer supplements the information obtained from other chiroptical techniques such as electronic or vibrational circular dichroism. CD spectroscopy is widely used in the study of optically active substances. CD spectroscopy provides information about the structure of optically active substances in the electronic ground state, however, CPL spectroscopy provides information about excited states. These two techniques are therefore complementary.



## High-Throughput

## Circular Dichroism (HTCD) System

### ■HTCD Plus■

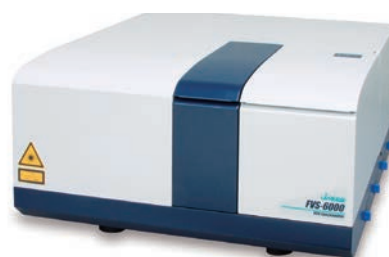
CD spectra are indispensable information for biopharmaceutical development and quality control because they reflect protein structure well. HTCD measurement system has been developed for use with either the J-1500 CD spectrometer and helps improve work efficiency by automating and accelerating CD measurements.



## Vibrational Circular Dichroism (VCD) Spectrometer

### ■FVS-6000■

The FVS-6000 VCD spectrometer measures both IR absorption and VCD, and provides accurate and highly sensitive measurement in the fingerprint region. It also has several unique features such as a wide measurement range option with a choice of detectors ( $4000 - 750 \text{ cm}^{-1}$ ).





# Polarimeters

## Polarimeter

### ■P-2000■

The P-2000 is a configurable high precision digital polarimeter with many options for measurement range, sampling accessories and software applications. Optional wavelength filters and source lamps cover a wide range of analytical wavelengths from UV-Visible to NIR in addition to the traditional sodium (589 nm) lamp used for regulatory compliance.

Two options for operation are available including Spectra Manager™ for Windows, and the intelligent remote module (iRM) with color LCD touch screen. For regulatory compliance a 21 CFR part 11 versions for Spectra Manager™ PC control is available.



# Dissolution Tester

## Dissolution Tester

### ■DT-810■

The DT-810 tablet dissolution tester features a circular design that provides completely uniform water temperature. The Direct-Center™ automatic centering mechanism provides guaranteed positioning of the dissolution vessels and drive shafts for accurate dissolution tests with high re-productibility. All components are controlled by Spectra Manager™ (or CFR) for simple operation.



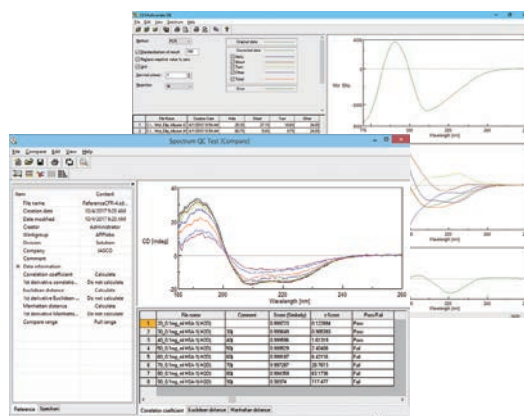
Fraction Flow System

# Spectroscopy Software Spectra Manager™ Suite

## Spectra Manager™ Suite Spectroscopy Software

### ■Spectra Manager™ Suite■

Spectra Manager™ Suite is an innovative cross-spectroscopy software platform. This single platform for data analysis is a unique and powerful way to manipulate and display data from any JASCO spectroscopy system UV-Visible/NIR, Fluorescence, FTIR, Circular Dichroism, ORD, LD, Raman, FT-Raman, Polarimeter and other types of data can be directly compared, processed, and reported. FDA 21 CFR Part 11 is a set of regulations regarding digital archiving of data and data records for GLP, GCP, and GMP procedures. Developed under the FDA standard for best practice ALCOA+, Spectra Manager™ CFR provides secure access and features compliant with 21 CFR Part 11.



# HPLC and UHPLC Systems

## HPLC and UHPLC Systems

### ■LC-4000 Series■

LC-4000 Series is a versatile LC that is flexible and easy to use for a variety of sample and measurement purposes.

RHPLC system with maximum operating pressure 700 bar, 70 MPa has been designed to future-proof your HPLC requirements. The LC-4000 UHPLC System is great for chromatographers who need to run a large number of samples or get results quickly. In addition to the metal-free wetted-part inert system, we also have a group of modules that can be used to build various systems such as GPC/SEC systems, recycling preparative systems.



- System Configuration  
Pump: PU-4180  
Degasser unit: DG-4000-04  
Autosampler: AS-4050  
Column oven: CO-4060  
Detector: RI-4030/UV-4070  
Data system: ChromNAV Ver. 2

**Versatile HPLC system**

## Compact HPLC System

### ■LC-4500 Series■

The only 15 cm wide modules of LC-4500 Series provide efficient use of lab space. This is a basic system that allows continuous injection of samples using an autosampler and HPLC measurement of substances with absorption in the UV and visible regions. The operation panel with numeric keypad facilitates stand-alone operation.

System upgrades in combination with LC-4000 modules are also possible.



- System Configuration  
Pump: PU-4580  
Degasser unit: DG-4580  
Detector: UV-4570  
Autosampler: AS-4550

**Compact HPLC isocratic system**

## Chromatography Data System ChromNAV

## Chromatography Data System

### ■ChromNAV Ver. 2■

#### ChromNAV Ver. 2 HPLC Software

The latest version of ChromNAV Ver. 2 HPLC software is a simple to use, and powerful Chromatography Data System. The highly configurable graphical-user-interface can be quickly set up to display only the functions necessary for your use. Users can quickly learn the operation and explore the extensive functionality for instrument control and data processing.

ChromNAV CFR – Fully 21 CFR part 11 compliant version of ChromNAV, with electronic signature and complete audit trail.



# Supercritical Fluid Chromatography / Extraction Systems

## SFC/SFE systems

### ■SFC-4000 Series■

The use of supercritical fluid chromatography (SFC) is a green alternative to traditional HPLC, with the use of CO<sub>2</sub> taking the place of organic solvent as the mobile phase. CO<sub>2</sub> has benefits for cost, and health & safety, as well as faster, cleaner sample recovery during sample purification. Other advantages of supercritical fluids include low viscosity with liquid-like densities, for higher solubility and increased column loading. The low viscosity and high diffusion lead to faster separations and faster extractions.

#### Analytical SFC System

Compared to chromatography using organic solvents, it is possible to analyze in a shorter time while maintaining high separation efficiency. Supercritical CO<sub>2</sub> is nonpolar, making it a powerful tool in normal-phase chromatography, especially in the separation and analysis of optically active substances. A wide range of samples can be handled by selecting modifiers.

#### Prep SFC system

Prep SFC system is designed for large scale throughput with 21 mm or 30 mm columns to maximum sample purification. The concentration process for treating the solution after preparative separation is shortened, significantly reducing the total running cost. The collection in the collection bin uses a gas-liquid separator microcyclone separator (patented) to obtain high purity recovered material. JASCO ChromNAV provides complete integrated control for flow rate, temperature, sample injection and fractionation.

#### Supercritical Fluid Extraction (SFE) Systems

The low viscosity and high diffusivity characteristics of supercritical CO<sub>2</sub> enable efficient and highly recoverable extraction. Monitoring with various detectors is available to examine extraction conditions. Extraction vessels suitable for both solids and liquids are available, from analysis to pilot plant scale.



Analytical SFC system



Prep SFC system

## LC-MS / SFC-MS

## LC-MS / SFC-MS systems

### ■LC-MS / SFC-MS■

The LC-4000 liquid chromatography and the SFC-4000 supercritical fluid system can be combined with a mass spectrometer. In addition to optical chromatograms, the acquisition of mass spectra dramatically increases the amount of information obtained from the sample.

Advion expression® CMS Single Quadrupole Mass Spectrometer Detector can be interfaced with HPLC or SFC for analytical to preparative scale separations. ChromNAV chromatography Data system, includes integrated control for selecting measurement parameters and executing measurement with timed event control for switching polarity and mass range.

In systems combining SCIEX QTRAP® and Triple Quad™ mass spectrometers with LC-4000, the total control is possible by incorporating the JASCO LC/SFC control driver into SCIEX Analyst ver. 1.6 or later.



LC-4000-MS system

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